

Appl. No. 09/998,512
Amdt. dated August 24, 2004
Reply to Office Action of June 4, 2004

REMARKS

Reconsideration of this application is requested. The claims submitted for reconsideration are claims 1 and 3-11.

Claim 1 has been amended to specify that the claimed process includes contacting the oxygenate with a small pore molecular sieve, consistent with what is described in the specification at page 5, lines 19-20, to form at least 20 wt% ethylene and propylene, water and oxygenated hydrocarbon, consistent with what is described at page 14, lines 3-4. In addition claim 1 has further been amended to include the limitation of now canceled claim 2. In view of canceling claim 2, claims 3 and 4 have been amended to correct claim dependency. Accordingly, no new matter has been entered.

I. Rejection of Claims 1, 2 and 5-11 Under 35 USC § 103(a)

Claims 1, 2 and 5-11 have been rejected under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 4,506,106 (Hsia) in view of U.S. Patent No. 6,506,106 (Kuechler '106) or U.S. Patent No. 6,121,540 (Kuechler '540). This rejection is traversed and reconsideration is requested.

Applicants' invention is to a process for separating oxygenated hydrocarbon from an olefin composition. The process comprises contacting an oxygenate with a small pore molecular sieve catalyst to form an olefin composition that includes at least 20 wt% ethylene and propylene, and which includes other components such as water and oxygenated hydrocarbon. The olefin composition is contacted with a quench fluid to cool the olefin composition and form a liquid water containing stream and an olefin containing vapor stream, with the liquid water containing stream comprising at least 1 wt % oxygenated hydrocarbon. The water containing stream is separated from the vapor stream, and the vapor stream is compressed. An olefin product stream and an oxygenated hydrocarbon containing stream are formed as a result of the compression, and the two streams are separated with the aid of a wash medium. The olefin product stream is separated into an ethylene containing stream and a propylene containing stream and the water containing stream and the oxygenated hydrocarbon containing stream are

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combined. Oxygenated hydrocarbon product is then recovered from the combined water containing stream and liquid oxygenated hydrocarbon containing stream.

As pointed out in the office action, Hsia discloses a process for converting an oxygenated hydrocarbon to an olefin composition, with the olefin composition including water and oxygenated hydrocarbon. The composition is cooled with an effluent cooler, and an olefin vapor stream is separated from a water/methanol stream. The vapor stream is further compressed and sent to a dimethyl ether (DME) absorber for removing the dimethyl ether.

In one aspect, Hsia differs from applicants' claimed invention in that Hsia does not disclose the use of a small pore molecular sieve to form an olefin composition that is relatively high in ethylene and propylene. In contrast, Hsia uses a medium pore zeolite to produce a heavier distillate product. See Col. 2, lines 60-64. Although the medium pore zeolite produces some ethylene, the ethylene compound is not a compound that is easily converted to the type of distillate product that the Hsia process is intended to produce. See column 3, lines 56-59 of Hsia. So, it is only logical to deduce that any increased ethylene product in a process like Hsia's would be undesirable and contrary to the Hsia process. Therefore, the Hsia process actually runs contrary to what applicants have claimed as their invention.

As stated in applicants' previous response, Hsia further differs from applicants' claimed invention in that Hsia does not disclose contacting the olefin composition with a quench fluid to cool the composition. Instead, Hsia uses an effluent cooler, which is shown to be an external type heat exchange device. Thus, there is no contact of Hsia's olefin composition with any type of cooling fluid for the purpose of condensing oxygenated hydrocarbon and water from the olefin stream emerging from the reaction system.

Using a quench fluid in the manner set forth in applicants' claims has the added benefit of achieving a high level of removal of oxygenated hydrocarbon. By removing a high level of oxygenated hydrocarbon with the water (i.e., at least 1 wt % oxygenated hydrocarbon) less oxygenated hydrocarbon will carry over with the olefin vapor. Thus, using a quench fluid to cool the olefin composition will more easily enable separation of a water stream containing at least 1 wt % oxygenated hydrocarbon.

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The Hsia process further differs from applicants' claimed process in that the Hsia process does not separate the olefin product stream into an ethylene stream and a propylene stream. Instead, Hsia separates out only an ethylene stream, since ethylene is not favorably converted to the distillate final product that the Hsia process ultimately strives to produce. The propylene is not divided out from the heavier olefins, because the propylene is oligomerized to the heavier distillate product along with all of the other higher olefins. To remove any propylene from the Hsia process would be counter productive, since the amount of desired distillate product would ultimately be reduced. It must, therefore, follow that to modify the Hsia process in a manner that would produce less of the desired product would necessarily destroy the entire Hsia process.

The Kuechler '106 and '540 references have been cited in an effort to demonstrate that the use of a quench fluid would have been an obvious modification of Hsia. Even if such an allegation could be demonstrated, and applicants make no concession in this regard, combining any further teaching of any Kuechler reference would destroy the desirable product produced by Hsia. This is because both Kuechler references are generally concerned with maximizing the amount of light olefin produced from methanol, whereas Hsia is concerned with maximizing the amount of distillate produced from methanol. To follow any of the teachings of Kuechler that lead to increasing light olefin would necessarily reduce the amount of desired heavier product produced by Hsia. Thus, the combination of Kuechler with Hsia, if anything, would negate the benefits of Hsia product. Therefore, the combination of either Kuechler reference with Hsia would necessarily result in contradictory outcomes.

II. Rejection of Claims 3 and 4 Under 35 USC § 103(a)

Claims 3 and 4 have been rejected under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 4,506,106 (Hsia) in view of U.S. Patent No. 6,506,106 (Kuechler '106) or U.S. Patent No. 6,121,540 (Kuechler '540), and further in view of U.S. Patent No. 6,137,022 (Kuechler '022). This rejection is traversed and reconsideration is requested.

Kuechler '022 has been cited for teaching that it is known to separate ethylene and propylene streams from olefin streams produced from methanol and to make polyethylene and polypropylene products from those streams. However, Kuechler '022 is no different from the other cited Kuechler references to the extent that the Kuechler '022 reference also strives to

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maximize ethylene and propylene production from a methanol feed. Thus, the benefit of using any of the Kuechler references in this regard would be to ultimately maximize polyethylene and polypropylene production, which is contrary to what Hsia teaches.

As noted above, Hsia teaches making distillate from methanol. It is beneficial to the Hsia process to actually reduce or remove ethylene from an olefin stream and oligomerize the remaining olefin to increase the amount of distillate produced. Therefore, any combination of any of the Kuechler references with Hsia would lead to increasing ethylene content of the Hsia process, which would actually destroy the benefit of the Hsia process. Such a combination of references can, therefore, only be construed as demonstrating that applicants' claimed process is in fact both novel and non-obvious.

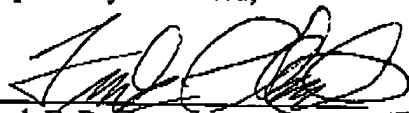
Having demonstrated that the cited references, taken either alone or in combination, fail to disclose or suggest the invention as claimed, this application is in condition for allowance. Accordingly, applicants request early and favorable reconsideration in the form of a Notice of Allowance.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated, since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1712 (Docket #: 2001B111).

Respectfully submitted,

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Date


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